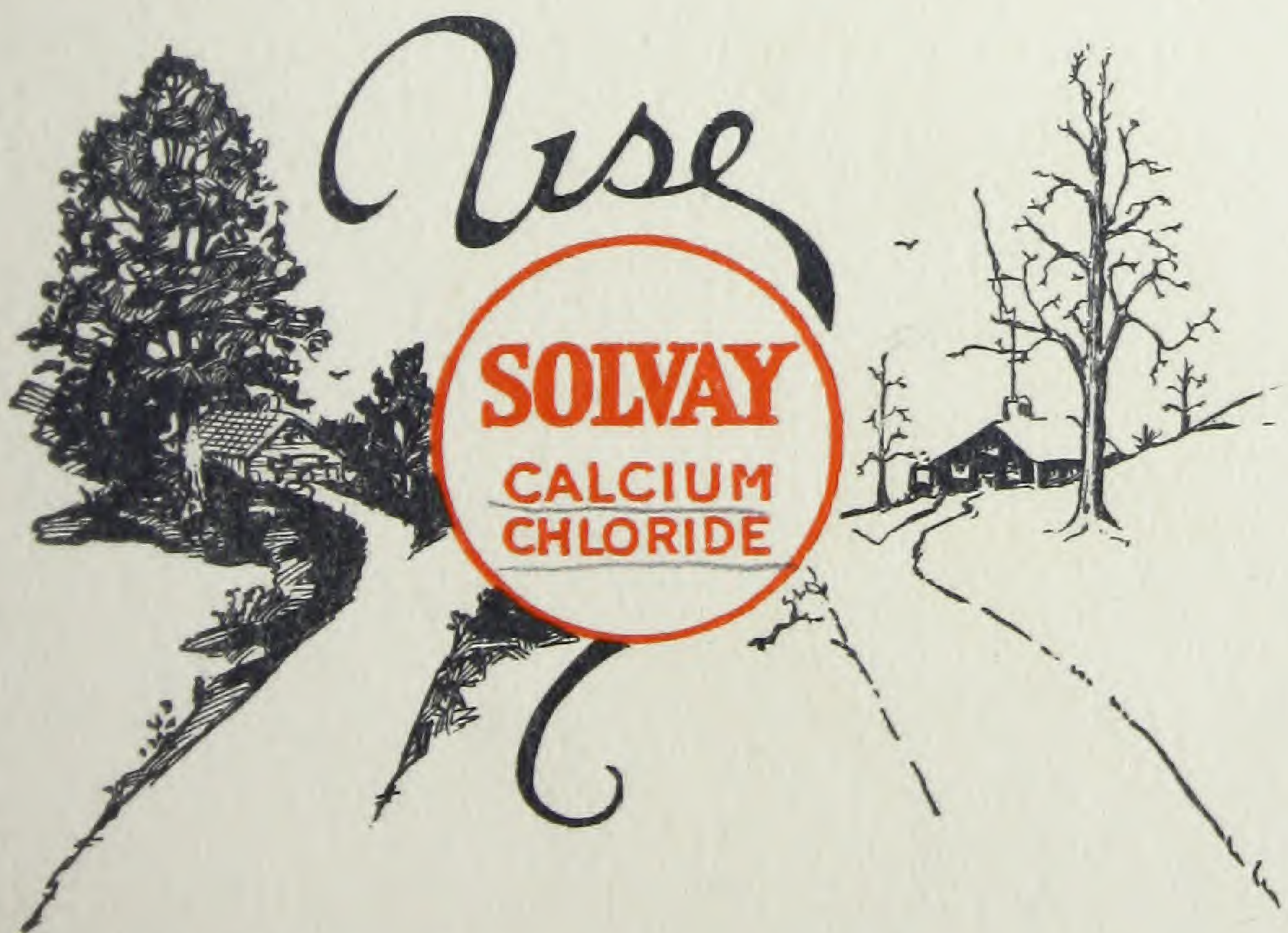


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For CONCRETE

SUMMER AND WINTER



WM. L. RIDPATH & SONS
421 BULLETIN BLDG.
PHILADELPHIA



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THE SOLVAY PROCESS COMPANY
Syracuse, New York

OCT 30 '25

FOR CONCRETE

Use

SOLVAY
CALCIUM
CHLORIDE

The Use of Calcium Chloride with Portland Cement.

Valuable Results Thoroughly Proven.

The Amount to Use and Cost.

Solvay Calcium Chloride Accelerates,
Water-proofs, Strengthens and Protects
Concrete Against Freezing Temperatures.

Accelerates.

Water-proofs.

Hardens and Densifies.

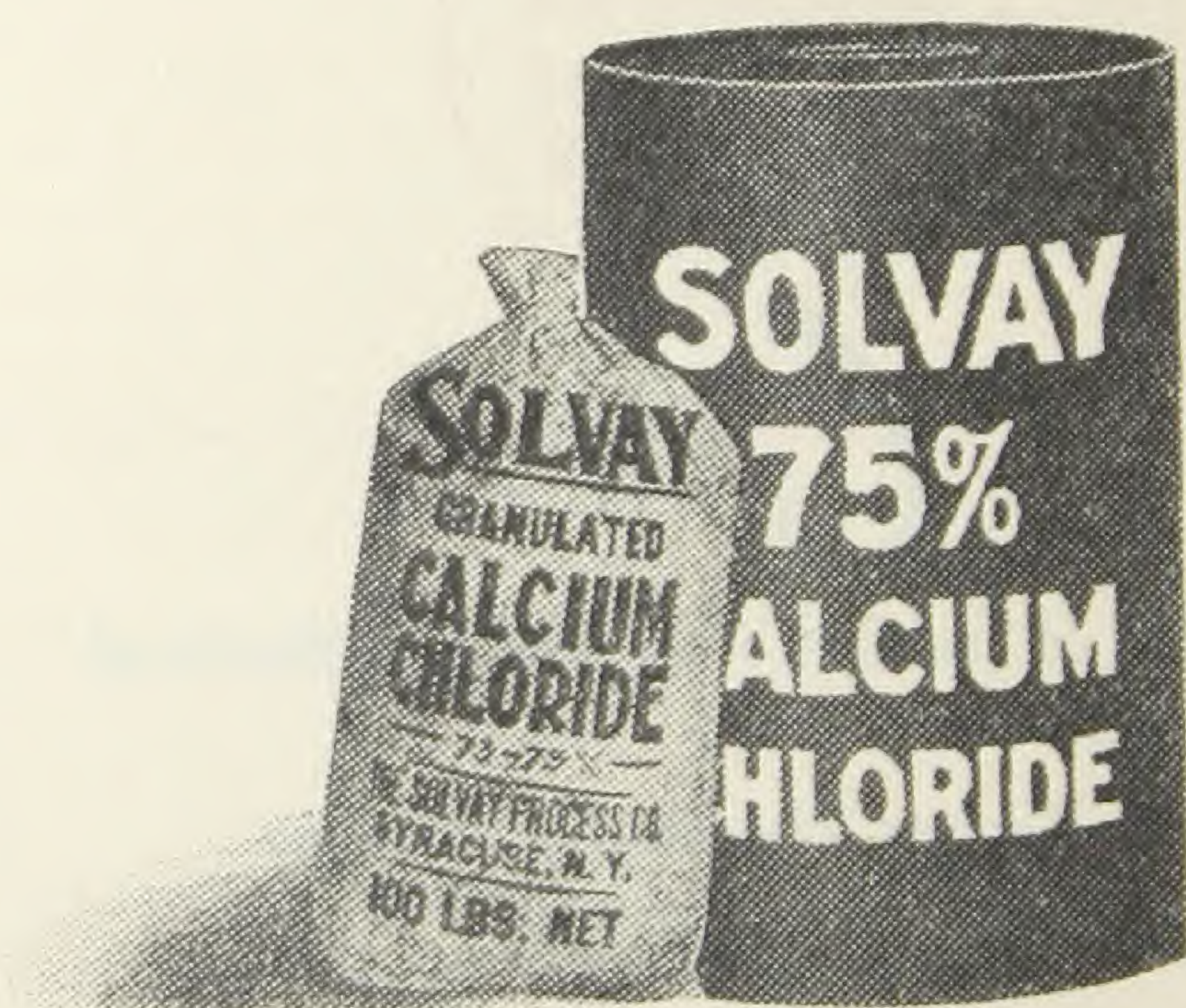
Protects Against Freezing Temperatures.

Directions for Using Solvay.

Does the Brand of Portland Cement Used
Affect Results?

Shipment.

The Manufacture of Concrete Products.



The Use of Calcium Chloride with Portland Cement

THERE has been within the past few years a constantly increasing demand on the part of engineers and contractors for a material or process which would accelerate the hardening of concrete; which would give it early strength, and at the same time not affect the setting of the concrete—the most desirable accelerator being one which would hasten the hardening and still not adversely affect the final setting.

Exhaustive tests have thoroughly proven that the material which best meets these necessary and important requirements is SOLVAY CALCIUM CHLORIDE. It not only gives early strength and hardness to concrete, but at the same time densifies, and water-proofs, and enables the concrete to resist freezing in winter temperatures. SOLVAY CALCIUM CHLORIDE is a white granular chemical, extremely hygroscopic and dissolves almost instantly in water. No stirring is required after it is once mixed.

VALUABLE RESULTS THOROUGHLY PROVEN

For many years Calcium Chloride has been used as the active ingredient in many proprietary articles sold as accelerators. That valuable results are obtained by the use of Calcium Chloride has been thoroughly proven by exhaustive tests made by the Bureau of Standards, American Society for Testing Materials, Portland

Cement Association, United States Engineers, Lewis Institute, Illinois State Highway Department, New York State Highway Department and The Solvay Process Company.

The first published work was done some years ago by the Bureau of Standards cooperating with the United States Engineers' office, Memphis, Tennessee. Tests were made with many different materials. Of these only Calcium Chloride showed any beneficial results. In the Standard Mortar Test, made with 3:1 Ottawa Sand, it was found that the addition of 2% to 4% Commercial Calcium Chloride (by weight of the mixing water) increased the tensile strength from 155% to 230% by the end of 24 hours, and from 173% to 190% at the end of 48 hours, without affecting adversely the initial set of the mixture.

During the past two years a sub-committee of Committee C-9 of the American Society for Testing Materials has conducted a cooperative series of tests on accelerators of the Calcium Chloride type. These tests, without exception, show a marked increase in early strength for cement mortar which contained 2% to 3% Calcium Chloride.

Thousands of tests have been made by many different organizations, and while there are some variations in results due to different brands of cement, aggregate used, and other variable factors, a summary of the tests show that 2% to 4% of Calcium Chloride to 100 pounds of cement accelerates the hardening of the concrete to a marked extent. In some cases 5 or 6 pounds of Calcium Chloride to 100 pounds of cement gave as satisfactory or better results. However, it is

Use SOLVAY CALCIUM CHLORIDE

strongly recommended that not over 4 pounds of Calcium Chloride to 100 pounds of cement be used, as almost invariably tests show that 2% to 4% Calcium Chloride gives as satisfactory or better results than larger quantities.

A summary of the many tests which have been made shows that additions of 2% to 4% (by weight of cement) of SOLVAY CALCIUM CHLORIDE in concrete mixtures increase the strength as follows:

AGE	COMPARATIVE STRENGTH
2 days	From 140% to 160% of the strength of untreated concrete or mortar.
7 days	From 115% to 132% of the strength of untreated concrete or mortar.
28 days	From 101% to 118% of the strength of untreated concrete or mortar.
3 months to 1 year	From 102% to 110% of the strength of untreated concrete or mortar.

Under average conditions, it will be found that the proper quantity of Calcium Chloride added to the mix will produce at the end of 48 hours, a concrete having the strength of a 7-day untreated concrete.

AMOUNT TO USE AND COST

For general concrete work, the usual practice is to use about 6 gallons of water to each bag of cement in gauging the mix. The Portland Cement Association recommends the use of the minimum amount of water found necessary under given conditions. However, as the quantity of water may vary from 5 to 8 gallons or more per bag of cement, it has usually proved most satisfactory to use as a basis for the addition of Calcium Chloride the quantity of cement going into each batch.

It is recommended that 2 pounds to each bag of cement be used at the start. Increasing the quantity increases the speed of the initial hardening and gives further protection against freezing. As much as 3 or 4 pounds may be added—depending on results desired.

SOLVAY CALCIUM CHLORIDE, east of the Mississippi, costs 2 cents per pound or less, depending on the quantity ordered and the distance from the source of supply. In the far west, the cost will be slightly higher. The quantity required for a given job can be easily estimated by figuring 2 pounds of Calcium Chloride to each sack of cement. It will be seen that the extra cost of using SOLVAY amounts to about 4 cents for each sack of cement. This slight extra cost is small in comparison with the time and labor saved and the better concrete produced.

SOLVAY CALCIUM CHLORIDE
ACCELERATES, WATER-PROOFS,
STRENGTHENS AND PROTECTS
CONCRETE AGAINST FREEZING
TEMPERATURES

SOLVAY CALCIUM CHLORIDE, being a part of the gauging water, thoroughly permeates the concrete and acts uniformly throughout the entire mass. In contrast to many integral materials, which do not dissolve readily in the gauging water, SOLVAY is extremely soluble, dissolving and permeating uniformly almost instantly, thus resulting in a uniformly finished structure. This makes it almost impossible for inexperienced workmen to jeopardize the success of the work. It is only necessary to add 2 to 4 pounds of the

Calcium Chloride to the gauging water for each bag of cement. With proper directions to insure the correct amount of Calcium Chloride for each batch, the most inexperienced men can be relied upon to produce satisfactory results.

ACCELERATES

TESTS made by the Bureau of Standards and The Solvay Process Company prove that Portland cement gauged by the solution of SOLVAY CALCIUM CHLORIDE attains greater strength in 48 hours than a corresponding mixture with plain water attains in 7 days. Think what this means! Cutting more than half the time forms must be kept in place and halving the time traffic must be kept off a concrete road or floor.

With SOLVAY, finishing is possible within a short time after pouring the concrete. Concrete placed at 8 o'clock can be finished by 11 o'clock. No overtime is required for finishing concrete placed late in the afternoon—thus effecting considerable saving of money for the contractor. Furthermore, SOLVAY-treated concrete sets at the bottom as fast as at the top, thus preventing strains and hair cracks, resulting in a better wearing surface.

The early strength given to freshly placed concrete prevents the collapsing of cell structure during the drying out. It increases the crushing, tensile and abrasive strength. It gives concrete "life".

The final set and strength of the concrete are in no way affected by the use of Calcium Chloride. In fact, tests indicate the final strength is increased by its use.

WATER-PROOFS

THE integral method of water-proofing concrete has been found to be the best, and is highly favored by engineers and contractors. SOLVAY CALCIUM CHLORIDE as part of the gauging water, thoroughly permeates the whole mass, thus is an integral water-proofer. The action of SOLVAY in accelerating early hardening gives strength to the concrete, preventing the collapse of the cell structure during the evaporation of the water. Porosity is thus reduced to a minimum and the concrete rendered dense and water-proof.

SOLVAY has a lubricating action on the cement, due, it is believed, to increasing the solubility of the silicates present. This causes the concrete or mortar to become more plastic and workable. Workmen like this "fatty" mix because it means quicker work and easier troweling conditions. As a result of this, the particles are all cemented together, producing a smooth surface, which is water-proof.

HARDENS AND DENSIFIES

THE use of SOLVAY CALCIUM CHLORIDE increases the strength and cementing qualities of cement and adds tensile and compression strength to the finished structure. The chemical action densifies the concrete which increases its resistance to dusting. Concrete or mortar gauged with SOLVAY CALCIUM CHLORIDE will absorb only about half as much water as water-gauged material. As a result, the SOLVAY-treated concrete is more resistant to wear—due to lessened porosity—and is also resistant to acids and alkalies.

SOLVAY CALCIUM CHLORIDE, because it is

used integrally, hardens the entire mass and not just the surface.

PROTECTS AGAINST FREEZING TEMPERATURES

THE Portland Cement Association has published a bulletin, "Precautions for Concrete Pavement Construction in Cold Weather". The following is taken from this bulletin:

"The only chemical recommended as an addition to the mixing water is Calcium Chloride. This material possesses the property of lowering the freezing point of water and accelerating the setting of the concrete. It is used by being dissolved in the mixing water. It is generally sold in crystalline form and is readily soluble in water. . . ."

The Calcium Chloride solution used for gauging the concrete will stand lower temperatures without freezing than plain water. In very cold weather, however, the usual precautions taken to protect the concrete should be adhered to. It is recommended that the aggregate and water be heated and the concrete covered or protected otherwise. Placing concrete subjected to high wind and also thin wall construction needs greater protection than mass construction.

SOLVAY raises the temperature of the mix, and its accelerating action on the setting creates heat.

As SOLVAY hardens the concrete in about half the usual time, the chance for freezing is naturally cut in half, and the forms and protection can be removed that much sooner.

For CONCRETE Winter and Summer

The following table gives the recommended proportions of SOLVAY to use for different atmospheric temperatures:

EXPECTED ATMOSPHERIC TEMPERATURES	PROPORTION OF SOLVAY TO WATER
+28° F	2 lbs. of SOLVAY to 6 gallons of water.
+20° F	3 lbs. of SOLVAY to 6 gallons of water.
+15° F	4 lbs. of SOLVAY to 6 gallons of water.

The above table is based on using approximately 6 gallons of water to each bag of cement.

DIRECTIONS FOR USING SOLVAY

ANY convenient method of weighing or measuring out the Calcium Chloride is satisfactory. The best one to use under given conditions will suggest itself. It is important to remember that for best results not less than 2 pounds nor more than 4 pounds of Calcium Chloride should be used to each bag of cement.

A gallon measure of Calcium Chloride will contain about 8 pounds. An ordinary 14-quart pail about three-quarters full will contain 18 to 20 pounds of Calcium Chloride, which, when dissolved in the necessary amount of water to fill a 50-gallon barrel, will make a solution of approximately 2 pounds of Calcium Chloride to 6 gallons of water. This solution can then be used for gauging the mix.

Another satisfactory method is to make up a standard solution, using water and a measured quantity of the solution with each batch. The following method is offered as a suggestion: Take one pail of SOLVAY CALCIUM CHLORIDE and 2 pails of clear water. Pour the water into a barrel or other suitable container and slowly add the Calcium Chloride, stirring until solution is com-

plete. This mixture will contain the following quantity of Calcium Chloride:

1 gallon	3.2 pounds of Calcium			
3 quarts	2.4	"	"	"
2 quarts	1.6	"	"	"
1 quart	0.8	"	"	"
1 pint	0.4	"	"	"

Then mix the batch of concrete or mortar, just as you have been in the habit of doing, only for each bag of cement used, add about 3 quarts of standard Calcium Chloride solution together with the necessary water and be prepared to find the mixture set in about half the usual time.

DOES THE BRAND OF PORTLAND CEMENT USED AFFECT RESULTS?

SOLVAY CALCIUM CHLORIDE may be used with any brand of Portland cement, although the results obtained by the use of Calcium Chloride with different brands will vary to a slight extent.

With most brands of Portland cement, the proper amount for general purposes is 2 pounds of SOLVAY CALCIUM CHLORIDE to each bag of cement. Should this proportion not give the desired results, the amount may be slightly increased. However, it is not recommended to use in greater proportion than 4 pounds of Calcium Chloride to each bag of cement.

SHIPMENT

SOLVAY CALCIUM CHLORIDE is shipped in non-returnable metal drums for which no additional charge is made. These standard drums contain 375 pounds each. SOLVAY is also shipped in

moisture-proof burlap, paper-lined bags, containing 100 pounds each. As the drums are absolutely air-tight and afford the chemical perfect protection, it is recommended that SOLVAY be purchased in drums whenever possible.

The Solvay Process Company carries stock of SOLVAY CALCIUM CHLORIDE in 50 cities in the United States, which gives prompt service with minimum transportation charges.

THE MANUFACTURE OF CONCRETE PRODUCTS

CONCRETE products can be made easier, cheaper and better by using SOLVAY. Calcium Chloride will help overcome the disadvantages of cold weather, increase the output of your plant, and improve the quality of your products all the year round. With SOLVAY your products will show a higher polish, owing to the density and smoothness which it gives to them.

Two pounds of SOLVAY CALCIUM CHLORIDE cost about 4 cents, and used as directed with each bag of cement will:

HALVE the time of setting.

DOUBLE the output of a plant having limited floor space.

INCREASE the early strength so blocks can be handled in half of the usual time.

PREVENT a large part of the loss from breakage.

LOWER the freezing point of the mixture so work can be done in cold weather without injury if properly handled.

Use SOLVAY CALCIUM CHLORIDE

SHORTEN the time that forms are tied up.
SAVE TIME in the steam room and often render it unnecessary.
ADD BUT LITTLE to the cost of the mix, but save tremendously in time and space, besides improving the quality of the product and increasing profits.

READ THIS LETTER!

New Bedford, Mass., Feb. 1, 1923.

MR. C. M. ADAMS, JR., Mgr.
Semet-Solvay Company,
77 Summer Street,
Boston, Mass.

Dear Sir:

I am pleased to inform you that I have used your SOLVAY CALCIUM CHLORIDE and will say I have found the results above all expectations. I have used all other known hardening and water-proofing compounds in the manufacturing of cast stone the past twenty years, and do not think any product on the market compares in any way with your SOLVAY CALCIUM CHLORIDE. Most specifically re: anti-freezing, density and as a fuel saving.

I have decided to use your product year round from now on.

Respectfully yours,

N. P. DUBUC, JR., *Manager*,
Modern Cast Stone Company.

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For CONCRETE

SUMMER AND WINTER

